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ABSTRACT

Studies are reviewed on the spontaneous speech of mothers of hearing children and hearing impaired children of various ages. Results are reported according to six major topics (sample findings in parentheses): syntax (the syntactic complexity and length of maternal utterances uniformly increased with the age of the hearing children from infancy to age 5, but not with the age of hearing impaired children); stereotyped utterances; other utterance types; discourse features (mothers tend to fill in conversation gaps with hearing impaired children); speech style variables (mothers of hearing impaired children use significantly more sentences that are run together and not separated by pauses); and functional code (the linguistic ability of the child is of greater importance to maternal conversation style than the child's chronological age). (CL)

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RESEARCH ON MOTHERS INTERACTING WITH HEARING-IMPAIRED CHILDREN*

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Research over the past decade has taught us much about the way adults and older children talk to younger children during the early stages of first language learning. It is now commonplace to find in the literature on child language development discussions about the syntactic, vocabulary, discourse and speech-style adjustments that parents make when addressing young children. Many articles also indulge in speculations about the role such adjustments play in promoting language learning; while others, less frequently, report manipulative research designed to assess the impact of variation of specific parental speech features on aspects of their children's development.

Following rather slowly behind this interest in the speech of parents to children developing language in normal fashion, there are now signs of an upsurge of interest in the language parents use to children who are communicatively impaired in some way.

At the First National (American) Symposium on Disorders in Language Development, held in Madison, Wisconsin last June, there were three papers examining the speech of parents to children with specific language

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EC 700 60

impairments and others concerned with parental speech to mentally-retarded and autistic children. Several papers have been published investigating parental conversations to Down's Syndrome children, and I know of similar work which is about to be commenced with blind children.

I think it is much to the credit of clinicians and educators of hearing-impaired children that their concern with parent guidance has led to an earlier interest in comparing parents of hearing and hearing-impaired children on similar language and speech variables, which means that we now have a more complete picture of parent-child interaction with hearing-impaired children than for any other area of handicap in development. This is not to say that we are in possession of enough details to put parent guidance programmes onto a solid empirical footing. It is still the case that research into the linguistic experiences of hearing children has far outstripped that for the hearing-impaired - especially in terms of the study of the pre-linguistic phases of development; and one can still bemoan the fact that there are far too few published comparisons of speech used to hearing-impaired and hearing children of the same ages and stages, and too little research which takes into account the effect of both the hearing-impaired child's hearing deficit and his/her communicative impairment on the parent's interaction style.

Let us review the major research in this area. Greenstein, Greenstein, McConville and Stellini (1976) conducted a longitudinal study of thirty hearing-impaired children between the ages of one and three years. They concluded that the affective elements of mother-child interaction were most closely associated with the children's language abilities. As Kirkman (1980) in a review of such studies points out, their results highlight "the interdependent effects of maternal acceptance of the child, early intervention, and child communicative ability" (p. 46). She further notes that the affective aspects take on significance beyond the usual parent-child relationship because of the special impact of a handicapped child on the relationship.

Most studies of parental speech to young hearing-impaired children reflect this special impact. For instance, Goss (1970) concluded that, in comparison with hearing children, mothers of hearing-impaired children praised their children less frequently and showed more verbal hostility.

Two studies (Weddel-Monnig and Westerman, 1977 and Morris, 1978) indicate that mothers of hearing-impaired children make fewer adjustments in their language over development; while two others (Gregory, Mogford and Bishop, 1979 and Mogford, Gregory and Keay, 1979) suggest that their speech actually becomes less, rather than more, complex as their children grew older. On the other hand, Anderson (1979) has concluded that maternal speech to hearing and hearing-impaired children was "strikingly similar" (p. 241). However, Anderson's comparison was not direct; the hearing sample was borrowed from Snow's (1977) report of only two children, and she herself used only three hearing-impaired children for whom the ages and stages of development were not well-matched. A further problem is noted by Nienhuys (personal communication) who points out that Anderson's categories were very general and do not permit valid comparison with other studies.

However, as Kirkman argues, the results of most studies are consistent with a conclusion drawn by Gregory (1976) who reported that mothers often states that it was pointless to converse with a child with severe hearing impairment. Kirkman concludes from her review of such studies that conversation between hearing-impaired children and their mothers does not appear to follow normal developmental trends, since it does not occur naturally. She considers that this may account for a finding by Howarth (1976) that increases in the complexity of maternal speech can be observed after the hearing-impaired child has reached school - a finding which is not consonant with the literature on mothers addressing hearing children beyond the age of five or six (e.g., Snow, 1972; Fraser and Roberts, 1975).

The Melbourne studies on speech to hearing-impaired children, in contrast to most of those reported above, have analysed maternal speech in detail in terms of the effects of child age, language production and comprehension, cognitive ability and hearing impairment on maternal conversational adjustments. They have also been systematic in comparing maternal speech to hearing-impaired children of different ages and stages of language ability to the appropriately matched hearing child groups. Much of the work our team (Cross, Nienhuys, Kirkman, Morris and Horsborough) has been doing over the last four or five years has been reported in several publications (e.g., First language, 1980, Proceedings of the International

Congress on Education of the Deaf, 1980, and the Australian Teacher of the Deaf, 1980).

What I propose to do is to summarize the general findings of these studies and then move on to make a first report of some of the more recent work we have completed.

METHOD

For all of our recent analyses and comparisons we have used six groups of mother and child pairs: four groups of ten hearing children and two groups of ten hearing-impaired children and their mothers, sixty pairs (dyads) in all. All the hearing-impaired children had been audiologically tested within three months prior to our contacting them. These children all had current hearing losses in the better ear in excess of 70 dB SPL HL at frequencies 500, 2000 and 4000 Hz. Their aided thresholds exceeded 40 dB over the same frequency range, and the hearing loss was prelinguistic in all cases.

Our four groups of hearing children represent different ages: infants, 3-6 months old (HO), one-year-olds, 10-12 months (H1), two-year-olds, 23-28 months (H2), and five-year-olds, 58-65 months (H5). The two groups of hearing-impaired children were selected to be comparable with the hearing groups in terms of either age, linguistic ability or cognitive ability. They were groups of two-year-olds (D2), 25-33 months, five-year-olds (D5), 55-68 months, respectively. In each group (hearing and hearing-impaired) there were five males and five females.

Our aim was to compare the mothers' spontaneous speech for all groups, recorded in naturalistic play situations, on a large number of measures of maternal speech features. We were particularly concerned to measure the differences in conversational style caused by the differences in age, language ability and hearing status of the child at each of the following levels of analysis: syntax, semantics, discourse structure, speech function, speech style, fluency and conversation structure. Thus for each level of linguistic analysis, we compared the appropriate groups using parametric analysis of variance with planned comparisons.

Before discussing these data, however, it is important to make clear the bases on which the groups were compared:

1. Age. In terms of age, the appropriate hearing-impaired versus hearing-child matches were between the mothers of the hearing-impaired and hearing five-year-olds on the one hand, and the mothers of the hearing-impaired and hearing two-year-olds. Thus, if age is the major influence on maternal conversation style, we would expect mothers of two- and five-year-olds to differ, with no differences between the hearing-impaired and hearing groups in these comparisons.

2. Language. In terms of language ability we used measures of both spontaneous speech complexity and language comprehension. On MLU, speech complexity, we obtained matches between the hearing two-year-olds and hearing-impaired five-year-olds (MLU's of 1.73 and 1.41 respectively). Their scores on vocabulary and comprehension tests were also very similar. We also had a match (though less precise) between the hearing one-year-olds and hearing-impaired two-year-olds, most of whom had not reached the single-word stage. However, their receptive vocabulary and linguistic comprehension test scores were quite similar and low. Thus, we could predict that if child linguistic ability is the major influence of maternal conversation style, there would be no differences in mothers addressing children of similar linguistic abilities.

3. Hearing Status. If, however, hearing impairment itself is a separate (and/or additional) factor in altering the normal adjustment pattern between mother and developing child, then we would expect to find differences between the mother of the hearing-impaired and hearing children despite matches for age or linguistic level.

4. General Aural Receptive Capacity. As a further test of the factor of hearing-impairment, we were able to establish a rank order of receptive abilities which included the group of mothers addressing infants of 3-6 months. In this way, we could also make direct comparisons between mothers' speech to the hearing-impaired children (especially the two-year-olds) and to hearing infants who would not

be expected to have any ability to process language as language, but who could be expected to provide their mothers with feedback as to their abilities to perceive the human voice.

RESULTS

The results of these comparisons are difficult to present clearly because the investigations have, over the years, produced a very large number of comparisons on an even larger number of features. However, I will attempt to summarize them under the headings of the major levels of linguistic analyses.

1. Syntax

(a) Syntactic Complexity. The major pattern of results for the comparison of all six groups was that the syntactic complexity and length of maternal utterances uniformly increased with the age of the hearing children from infancy to five years of age. Thus as hearing children grow older, and more communicatively able, the normal pattern is for their mothers' language to become gradually more complex.

However, it is of interest to note that the pattern for the hearing-impaired groups is dissimilar. Here we tend to get a pattern which neither reflects the age nor the linguistic abilities of the hearing-impaired children. In fact, for almost all of our measures of language complexity, we have found that maternal language to both hearing-impaired groups is at least as simple as (and often simpler than) mothers addressing hearing infants.

We now feel that these results are not difficult to explain. Subsequent and more detailed analyses of the utterances mothers use to hearing-impaired children, particularly the younger ones, have shown that they use greater proportions of single word utterances, labels, repeated verbs and noun phrases, WH words and stereotyped routines or stock expressions than do mothers of one- or two-year-old hearing children. This appears to be a direct response to their perceptions of the consequences to

the child's communicative potential of the serious hearing deficit, and supports Gregory's (1976) conclusion that mothers fail to match their hearing-impaired children's linguistic capacity because, in their view, it seems pointless to converse naturally with a child with a severe hearing impairment. The adjustments they do make seem to be either tutorial - teaching and repeating to the child the names of things and actions - or aimed at filling the conversational gaps by means of ready-to-hand stock expressions delivered in monologue-style.

(b) Sentence Types. The mothers' choices of sentence types also provided interesting differences between the mothers of the hearing-impaired and hearing children. The pattern for the hearing groups for this group of maternal features (shown in Table 2) is not generally linear. In regard to the hearing-impaired child-mother groups, the unusual patterns are in the mothers' clear failure to match the child's linguistic or age level in the incidence of tagged declaratives and ellipitical utterances in both the D2 group and the D5 group (although an age-matched result is obtained in the D5 group for ellipsis). However, it is generally evident that in choice of sentence-type, the mothers of the hearing-impaired children show that they are capable of adjusting their language in much the same way as mothers of hearing children. This pattern of resemblance to the hearing groups is continued for the sentence fragments (Table 3). This again suggests that these mothers do respond to their child's language level at least in general terms. It is important to note, however, that there are several small but reliable differences between the age and language-matched comparisons with the hearing groups. This suggests to us that, although the hearing-impaired groups' mothers are able to make generally similar adjustments, they are not able to fine-tune these adjustments as closely to their children's actual measured linguistic performance as the hearing-group mothers.

I would like to also draw your attention in Table 3 to the

deviation for the hearing-impaired group in the incidence of Wh phrases. These are relatively depressed for the D2 mothers and considerably heightened for the D5's, which also reflects the pattern for complete Wh questions. Analysis of the transcripts showed that this was due in the D2's case to a reduction in questions for information purposes - genuine as against rhetorical questions; and in the D5 case, we noted a high frequency of "What's that?" style of question, typical of the "naming game" played by mothers of hearing prelinguistic toddlers, but in substantially increased numbers. We feel that this may reflect a tutorial device adopted by mothers of older hearing-impaired children possibly in response to advice from parent guidance sources.

2. Stereotyped Utterances

A sizeable proportion of maternal speech has been shown to consist of routine, frequently repeated stereotyped phrases. In our investigations this represented a category of maternal speech features in which there was a general tendency for the hearing-impaired groups' mothers to differ substantially from the appropriate hearing groups. As Table 4 shows, the main differences were found in the use of idiomatic imperatives (e.g., Come on, Wait on, Come here), for the D5's, in the high proportion of idioms overall, and in the much increased use of "Look" and "See" attentionals for the D2 group.

The D5 differences are consistent with the conclusion that the mothers are responding to the "gaps" in the conversation, caused by the older hearing-impaired child's deficits as a conversational initiator, by resorting to well-tried idioms to carry the conversation. In this case, it can be clearly seen that they resemble the mothers of the hearing infants. On the other hand, the pattern for the younger D2 group suggests a more direct response to the child's receptive handicap. The inflated use of attentionals, far beyond the level used to hearing infants and toddlers, is indicative of a strongly perceived need to keep drawing the child back into the conversation and to constantly keep

his/her attention focussed on the mother's activities and utterances.

3. Other Utterance Types

Table 5 contains data on the incidence of utterance types which are rarely found in normal adult speech, but which reach significant proportions in the speech of mothers to infants - vocatives, greetings, action routines and semantically-empty utterances (proposition-free). The hearing-groups data in Table 6 show a predictable and clear tendency for these utterances to decrease as the infant reaches the stage of using language (i.e., at the H2 level) and to disappear from the speech of mothers addressing five-year-olds. There is a rapid trend for parental speech to approach the normal adult style in these features. However, the hearing-impaired data, especially for the D2 group, although following this trend, does so much more slowly. Moreover, it is clear that for some features, there are frequencies in the D2 group which are too low for the linguistic hearing match - greetings and action routines - or too high - vocatives. We feel that these differences are directly attributable to the special difficulties of interacting with young hearing-impaired children. The higher incidence of vocatives reflects the pattern for attentionals and imperatives, and seems to be caused by frequent attempts to maintain the child's attention to both the conversation and the play-affectionate quality in the interaction, since this is the role they seem to play in the hearing interactions between mothers and infants. The reduction in action routines, we feel, can be explained by reference to the video-tapes which showed fewer interchanges where the hearing-impaired mothers actively participated in child-centred play activities. This would, of course, provide fewer opportunities than for the hearing infants for the mother to accompany the child's (or her own) actions with appropriate words or phrases.

4. Discourse Features

The discourse features I have selected to discuss (see Table 6) are those for which there has been much debate and discussion in the hearing literature about their usefulness in promoting syntactic

acquisition and clarifying the meaning of adult speech to their children. The patterns of difference here for the mothers of the hearing-impaired children are quite marked. They too generally indicate a strong tendency for the mothers to carry a larger proportion of the conversational burden than occurs for the comparable hearing comparisons.

Table 6 also shows that although the D2 mothers tailor their tendency to repeat themselves to the child's language level (as shown by comparison with the H1 hearing match), the D5 mothers keep up a rate of repetitions much higher than their H2 counterparts. In contrast, expansions and imitations (measures of the tendency to repeat what the child was attempting to communicate) are considerably reduced for the D2 mothers - almost to the level of the non-linguistic hearing infant group.

This pattern seems to be a result of two factors: firstly, the mother's difficulty in comprehending what the child intended to say and, secondly, what seems to be a less intensively child-centred approach to parent-child conversations.

The higher prevalence of self-answers for both hearing-impaired groups seems to be another, and clearer, indicator of the mothers' tendency to fill the gaps in the conversation by resorting to a "two-part" monologue-style.

We feel that this Table presents a pattern of results which should give pause to those who would wish to assist parents in promoting language development in hearing-impaired children. On the one hand, we can show that some classes of spontaneous tutorial devices are over-used and, on the other, that others are under-used, in comparison with the hearing groups. Both situations appear to us to be different facets of an understandable response to the same communicative problem in the child. Invervention in remedying one deviation may result in unwanted depression of the other in natural conversational situations.

5. Speech Style Variables

The results of our analyses of the normal developmental trends in speech-style variables are, like the complexity measures, very regular indeed. The overall hearing pattern clearly indicates a strong trend towards increasing degradation in speech style (i.e., a trend towards more adult-like relaxed speech) with increments in the hearing child's maturity - in both age and linguistic ability. At the same time, there is a similar developmental trend towards relinquishing single-word utterances and incomplete sentences as the hearing children mature, and this is also a trend towards normal, conversational, adult speech characteristics.

The hearing-impaired maternal groups deviate markedly from these trends, especially if we consider them to be adjusted to child linguistic maturity (rather than simply to age) as in the hearing samples. Their mothers use significantly more sentences that are run together and not separated by pauses. This suggests a carelessness in monitoring the child's limited ability to process a deal of linguistic information at any given time. However, this is directly contradicted by the other findings in Table 7. They also use fewer disfluent utterances than their hearing-group counterparts, fewer degraded utterances in total, fewer incomplete sentences, fewer grammatically unacceptable utterances, but many more single-word utterances than would be predicted from the hearing data.

All these latter results suggest, in contrast, a very conscientious monitoring of the perceptibility and salience of their speech to their children, as well as some attention to its processability as language input. Such a degree of monitoring would appear to be unnatural for the mothers of hearing children and verifies the somewhat strained nature of their conversations reported by our observers. However, given the nature of their partner's hearing impairment, this too is an understandable adaptation. I believe it would be difficult to justify intervention to "normalise" this aspect of their conversations (with the possible exception of single-word usage) without a great deal more knowledge than we have at present about the appropriate ways to minimize distortion of the speech signal to such children.

6. Functional Code

At a later date, in an independent analysis conducted by Kirkman at the University of Melbourne, we adapted a functional code developed by Dore, Gearhart and Newman (1978) which differentiated at three hierarchically arranged levels approximately forty speech acts. We applied this speech act code to five of our six groups, omitting the hearing infant (HO) group. This aspect of the work was undertaken to determine whether the functional level of maternal speech (the underlying communicative purposes for which language is used) would also be responsive to the linguistic abilities of the children and reflect patterns similar to those we had found for the surface structural and discourse analyses.

Table 8 provides a summary of the data for the first two levels of this hierarchical code, omitting the more detailed data at the individual speech act level which showed similar but more pronounced trends.

In summary, the data for the hearing groups showed differences between all the age groups in measures of both mother and child communication. The fact that the most marked differences were discernible between the mothers of the pre-lingual one-year-olds and the mothers of the two-year-olds encourages the inference that the acquisition of formal aspects of language strongly affected maternal conversation.

This result matched our analyses of syntax and discourse features, suggesting that adjustments are made to many facets of adult speech to children. It also demonstrated the sensitivity of the conversational act code to variations in mother-child interaction, and showed further that it was appropriate for use with non-verbal children.

Hence, we moved on to a second study which was designed to extend the first by investigating whether mothers of hearing-impaired children use a similar conversational style when compared with mothers of hearing children, and whether any similarity is related to the age or linguistic ability of the child. Additionally it was proposed to

assess whether the nature of the interaction was likely to be helpful to the hearing-impaired child's acquisition of language. Thus, we included our two groups of hearing-impaired children and their mothers in the second comparative analysis.

The results of this study, summarized very briefly in Table 8, indicated that the linguistic ability of the child (the H2 + H5 vs D2 + D5 column) is of greater importance to maternal conversation style than the child's chronological age. However, several anomalies in the speech of mothers to the younger hearing-impaired children (as in the syntactic analyses) hinted at the severe communicative difficulties inherent in, firstly, the child's hearing-impairment (that is, his/her receptive handicap) and, secondly, in parental attitudes to the handicap. The mothers of the Hearing-Impaired Two's were found to use fewer suggestions and certain kinds of regulative functions and assertions. On the other hand, they were found to use significantly more assertions about perceivable phenomena and many more attention-getters. Both hearing-impaired groups deviated in terms of the higher use of protests or warnings, self-answers and speech to solicit control of others. Most of these differences could be best explained as fairly direct consequences of interacting with a child who is unable to attend to, and easily comprehend, what the mothers were saying. As in the previous analyses, there were some indications that both mother and child, as a result of such experiences, were tending to opt out of a genuine conversational situation in favour of one in which the mother sometimes adopted a monologue style.

CONCLUSIONS

In summing up our results for the hearing mother-child groups, it seems reasonable to conclude that the developmental trends in normal parent-child conversational interaction indicate that parents are sensitive to, and respond linguistically to, feedback from their children's increasing communicative capabilities. This feedback often seems to be provided by the child's ability to produce evidence of comprehending individual parental utterances. However, despite the fact that we would want to give a primary role to the child's level of comprehension, there are

indications in our "hearing" data that other facets of the child as a conversation partner also affect the parent's linguistic choices. Some changes over time seem to be directly related to improvements in the infants' attentional capacities - such as the decrease in attentionals, vocatives, etc.; others are more directly associated with advances in motoric development which introduce an element of linguistic control into the interaction and, hence, the frequent use of the imperative form. Still other features, e.g., greetings, endearments, social routines, interjections, and (to a certain extent) idioms, seem to highlight the affective tone of mother-infant interaction and decrease as the need for control and information-sharing is introduced into the interaction by the child's maturation. In this sense we are proposing a multi-factor account as a complete explanation of the changes that take place in a number of levels of analysis during the hearing child's development.

The main difference that we can see between the adjustments in the conversations of parents of hearing and hearing-impaired children are concerned with (a) fine-tuning, (b) developmental direction, and (c) sensitivity to the child's actual and potential linguistic ability. These differences are most marked for the younger hearing-impaired child group, and appear to become gradually less so as the hearing-impaired child matures. However, as you will no doubt have concluded yourselves, even at age five there are still clear signs that the hearing-impaired child's mother, influenced by the extent of his/her communicative handicap, is failing in some important respects to adjust her language and speech style to her child's linguistic ability. Whether it is wise to counsel intervention to bring her adjustment into line with the mothers of hearing children of either similar linguistic abilities or age is still an open question. Before we can answer it, we must be able to answer several others first, including the crucial question of whether the mere fact of deviance from mothers of hearing children constitutes a <u>prima facie</u> reason for intervening to "normalize" the interaction styles of mothers of hearing-impaired children. We have yet to obtain a clear answer to the question of whether some of the special adjustments of these mothers are specifically made to compensate for their children's hearing deficits. We have just commenced the type of research which may tell us what maternal adjustments lead to superior language in hearing-impaired children. The answers we obtain from this latter project should place us in a better position to advise professionals attempting to guide parents in this aspect of their interactions.

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TABLE 1

Complexity and Length Measures

Mothers' Speech Variables - Means

Mother Groups	Rich Complexity	Standard Complexity	Sentence Complexity	M.L.U.	M.M.L.U.
H0	0.91	0.82	1.21	4.00	9.83
H1	1.03	0.81	1.21	5.50	10.16
H2	1.11	0.96	1.27	4.96	11.06
H5	1.15	1.10	1.35	5.71	11.81
D2	0.95	0.80	1.14	3.60	8.52
D5	1.00	0.81	1.12	4.19	9.60
Significant Differences:		H1-H2*			
	H2-D2≠	H2-D2**	H2-D2**	H2-D2**	H2-D2**
		H2-D5≠	H2-D5**	H2-D5**	
	H5-D5*	H5-D5**	H5-D5**	H5-D5***	H5-D5***

≠ p<.10
* p<.05
** p<.01
*** p<.001

TABLE 2

Sentence Types

Mother Groups	Y/N Quest.	Wh Quest.	Declarative	Declarative ≠ Tag	Deixis	Imperative	Elliptical
H0	15.11	11.75	17.46	4.47	1.60	9.51	3.06
H1	8.18	9.12	17.02	5.67	3.81	15.21	0.76
H2	10.10	15.85	22.20	5.25	5.50	9.05	1.50
H5	10.45	12.55	28.40	6.90	4.25	6.25	2.35
D2	9.10	8.10	16.70	2.70	6.40	16.65	1.40
D5	9.65	16.35	19.90	2.30	5.90	9.75	0.85
Significant Differences:	H0-H1*				H0-H1**	H0-H1≠	H0-H1*
	H0-D2≠				H0-D2**	H0-D2*	H0-D2≠
	H0-D5≠	H1-H2**			H0-D5***	H1-H2*	H0-D5**
		H1-D5**		H1-D5≠		H1-D5*	
		H2-D2**	H2-D2≠	H2-D2*		H2-D2*	
				H2-D5*			
			H5-D5**	H5-D5***	H5-D5*	H5-D5*	
	D2-D5***					D2-D5**	

TABLE 3

Sentence Fragments (Propositionally Opaque)

Mothers' Speech Variables (Mean Percentages)

Mother Groups	Noun Phrases	Prepositional Phrases	WH Phrases	Y/N Words
H0	1.90	.40	.16	7.66
H1	4.79	.96	0	4.18
H2	8.90	2.00	.30	8.45
H5	5.20	2.00	.60	11.45
D2	7.75	1.60	.15	3.10
D5	10.85	2.35	2.05	7.00
Significant Differences:	H0-H1**		H0-H1+	H0-H1*
	H0-D2*	H0-D2*		H0-D2**
	H0-D5***	H0-D5***	H0-D5***	
	H1-H2*	H1-H2+	H1-H2+	H1-H2**
	H1-D5**	H1-D5*	H1-D5***	
			H2-D5***	H2-D2***
	H5-D5**		H5-D5**	
			D2-D5***	D2-D5*

TABLE 4

Stereotyped Utterances

Mothers' Speech Variables (Mean Percentages)

Mother Groups	Social Stereotypes	Imperative Idioms	All Idioms	Look	Attentionals (Look & See)	Stock Expressions
H0	.60	6.11	10.03	1.71	1.96	2.35
H1	1.66	2.81	7.29	4.06	4.37	1.10
H2	1.10	.20	2.90	1.80	2.20	.90
H5	.15	.40	3.50	1.40	1.60	.30
D2	1.10	1.65	3.90	9.05	10.15	.55
D5	.55	5.55	6.70	1.90	2.05	.40
Significant Differences:				H0-H1*	H0-H1+	
		H0-D2*	H0-D2*	H0-D2**	H0-D2**	H0-D5+
		H1-H2*	H1-H2**	H1-H2**	H1-H2**	H0-D5+
			H1-D2*	H1-D2*	H1-D2*	H1-D2+
				H1-D5**	H1-D5**	
		H2-D2*		H2-D2**	H2-D2**	
				D2-D5**	D2-D5**	

48

TABLE 5

Other Utterance Types - (Preposition Free)

Mothers' Speech Variables - (Mean Percentages)

Mother Groups	Vocatives (Name)	Greetings	Action Routines	Total Prop. Free
H0	3.33	3.01	1.56	9.03
H1	2.66	4.43	1.91	9.56
H2	.20	.25	.25	1.20
H5	.15	0	0	1.15
D2	4.85	1.25	.55	7.60
D5	1.90	.15	.30	2.70
Significant Differences:		H0-D5*	H0-D5+	H0-D5**
	H1-H2*	H1-H2**	H1-H2+	H1-H2***
		H1-D2*		
		H1-D5**		H1-D5***
	H2-D2**			H2-D2**
	H2-D5**			H2-D5*
	H5-D5**			H5-D5*
	D2-D5*			D2-D5***

TABLE 6

Discourse Features

Mothers' Speech Variables (Mean Percentages)

Mother Groups	Total Repetitions	Total Expansions	Total Imitations	Self Answers
H0	23.20	0	0	1.44
H1	20.60	0	.25	1.00
H2	8.05	10.10	4.90	0.85
H5	2.80	2.30	2.10	0.65
D2	20.85	0.65	0.15	2.00
D5	13.15	4.85	3.10	2.00
Significant Differences:	H0-D5*	H0-D5**	H0-D5**	
	H1-H2***	H1-H2***	H1-H2***	
	H1-D5*	H1-D5***	H1-D5**	H1-D5*
	H2-D2**	H2-D2***	H2-D2***	H2-D2*
	H2-D5*	H2-D5*		H2-D5*
	H5-D5***	H5-D5*		H5-D5*
	D2-D5*	D2-D5**	D2-D5**	

TABLE 7

Mothers' Speech Style

Mothers' Speech Variables (Mean Percentages)

Mother Groups	Run On	Disfluent	Total Degraded Sents	Incomplete	Unacceptable	Single Words
H0	0.25	0.70	0.95	0.60	1.89	14.60
H1	0.45	1.51	1.96	0.96	2.27	15.88
H2	0.40	3.60	4.00	1.25	2.10	6.35
H5	1.55	3.90	5.45	2.80	1.70	3.50
D2	2.45	1.35	3.80	0.65	1.55	23.95
D5	1.55	2.30	3.85	1.70	0.90	10.50
Significant Differences:	H0-D2*		H0-D2*			H0-D2≠
	H0-D5*	H0-D5**	H0-D5**	H0-D5***	H0-D5≠	
		H1-H2*	H1-H2≠			H1-H2***
	H1-D2≠					H1-D2≠
	H1-D5≠		H1-D5*	H1-D5*	H1-D5*	H1-D5**
	H2-D2≠	H2-D2*				H2-D2***
	H2-D5≠				H2-D5*	H2-D5**
		H5-D5≠				H5-D5***
		D2-D5≠		D2-D5**		D2-D5**

TABLE 8

Mean Scores and Results of Comparisons for Types of Conversational Acts in Mothers' Speech

Conversational Act Code	Mean Score						Comparisons		
	H1	H2	H5	D2	D5	Overall	H1 & H2 vs D2 & H5	H2 & H5 vs D2 & D5	H1 & D5 vs H2 & D2
Requestive									
1. Solicit Information	41.3	59.0	58.0	41.5	59.3	*		g	
2. Solicit Action	29.4	17.6	11.9	23.6	13.3	θ	g		
Assertive									
3. Perceivable Phenomena ..	26.3	21.8	32.4	47.4	22.6	θ	**g		θθ
4. Internal Phenomena	14.4	6.4	9.6	5.9	8.9	*	g		θθ
5. Social Phenomena	4.1	5.3	10.0	2.3	4.8	**		**g	
Performative									
6. Initial	18.6	0.8	0	8.6	7.0	θ		θg	
7. Reactive	1.8	1.3	0.4	3.3	2.0	*		**g	
Responsive									
8. Supply Solicited Information	3.1	6.4	11.0	5.3	6.0	θ		**g	
9. Supply Additional Information	13.1	39.1	36.1	6.0	32.0	θ		**g	
Regulative									
10. Solicit Other	25.4	32.0	9.0	38.9	33.3	θ		θg	
11. Mark Content	3.3	1.1	3.1	3.4	3.4		g		
12. Expressive	17.9	7.6	8.6	11.5	4.4	**	g		
Uncodable	1.3	1.4	3.5	1.9	2.6		g		
Unintelligible	0.5	0.4	4.6	0.6	0.6	*			

* $p < .05$ (2 tt)
** $p < .01$ (2 tt)
θ $p < .001$ (2 tt)
θθ $p < .001$ (1 tt)

g indicates which of the two alternative hypotheses obtained the higher score.
A higher score for H1 & H2 vs D2 & D5 suggests that age is more pertinent.
A higher score for H2 & H5 vs D2 & D5 favours language ability.